

-continued

## (2) INFORMATION FOR SEQ ID NO:8:

- (i) SEQUENCE CHARACTERISTICS:  
 (A) LENGTH: 45 amino acids  
 (B) TYPE: amino acid  
 (C) STRANDEDNESS: single  
 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:8:

Lys	Ser	Cys	Cys	Lys	Ser	Thr	Leu	Gly	Arg	Lys	Cys	Tyr	Asn	Leu	Cys
1							5		10					15	
Lys	Val	Lys	Gly	Ala	Lys	Lys	Leu	Cys	Ala	Gly	Val	Cys	Lys	Cys	Lys
	20						25			30					
Leu	Thr	Ser	Ser	Gly	Lys	Cys	Pro	Lys	Gly	Phe	Pro	Lys			
	35						40			45					

## (2) INFORMATION FOR SEQ ID NO:9:

- (i) SEQUENCE CHARACTERISTICS:  
 (A) LENGTH: 45 amino acids  
 (B) TYPE: amino acid  
 (C) STRANDEDNESS: single  
 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:9:

Lys	Xaa	Cys	Cys	Xaa	Ser	Thr	Leu	Gly	Xaa	Xaa	Xaa	Tyr	Asn	Leu	Cys
1							5		10					15	
Xaa	Val	Xaa	Gly	Ala	Lys	Xaa	Leu	Cys	Ala	Gly	Val	Xaa	Xaa	Cys	Xaa
	20						25			30					
Leu	Thr	Ser	Ser	Gly	Xaa	Cys	Pro	Thr	Gly	Phe	Pro	Xaa			
	35						40			45					

What is claimed is:

1. A protein having the sequence of SEQUENCE 1.D. No. 1 wherein the amino acid residues at one or more of positions 5, 10, 11, 12, 17, 19, 22, 30 and 41 are lysine, and the remainder of the residues at those positions are the residues at the corresponding positions in SEQUENCE 1.D. No. 1.

2. A protein according to claim 1 wherein one or more of the the amino acid residues at positions 5, 11, 12, 17, 19, 22 and 41 are lysine.

3. A protein according to claim 2 wherein all of the amino acid residues at positions 5, 11, 12, 17, 19, 22 and 41 are lysine.

4. A nucleotide sequence which codes for a protein according to claim 1.

5. An RNA sequence according to claim 4.

6. A DNA sequence according to claim 4.

7. An expression cassette containing the DNA sequence of claim 6 operably linked to plant regulatory sequences which cause the expression of the DNA sequence in plant cells.

8. A bacterial transformation vector comprising an expression cassette according to claim 7, operably linked to bacterial expression regulatory sequences which cause replication of the expression cassette in bacterial cells.

9. Bacterial cells containing as a foreign plasmid at least one copy of a bacterial transformation vector according to claim 8.

10. Transformed plant cells containing at least one copy of the expression cassette of claim 7.

40 11. Transformed cells according to claim 10, further characterized in being cells of a monocotyledonous species.

12. Transformed cells according to claim 11, further characterized in being maize, sorghum, wheat or rice cells.

13. Transformed cells according to claim 10, further characterized in being cells of a dicotyledonous species.

14. Transformed cells according to claim 13, further characterized in being soybean, alfalfa, rapeseed, sunflower, tobacco or tomato cells.

50 15. A maize cell or tissue culture comprising cells according to claim 12.

16. A transformed plant comprising transformed cells according to claim 10.

55 17. A method for killing and inhibiting plant pathogenic microorganisms which are susceptible to a-Hordothionin comprising introducing into the environment of the pathogenic microorganisms an antimicrobial amount of a protein according to claim 1.

60 18. A method for killing and inhibiting plant pathogens selected from *Fusarium graminearum*, *Fusarium moniliforme*, *Diplodia maydis*, *Colletotrichum graminicola*, *Verticillium alboatrum*, *Phytophthora megaspermae* f.sp. *glycinea*, *Macrophomina phaseolina*, *Diaporthe phaseolorum* *caulivora*, *Sclerotinia sclerotiorum*, *Sclerotinia trifoliorum*, and *Aspergillus flavus*, comprising introducing into the environment of the pathogenic microorganisms an antimicrobial amount of a protein according to claim 1.

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19. A method according to claim 17 wherein the environment of the pathogen is the tissues of a living plant.

20. A method for enhancing the lysine content of a plant cell or seed comprising the step of causing a protein according to claim 1 to be expressed in the cell or seed.

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21. A method for enhancing the lysine content of a plant comprising the step of causing a protein according to claim 1 to be expressed in tissues of the plant.

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